ABSTRACT

The problem of magnetoelastic circumferentially-magnetised torque transducers having a zero output magnetic field at zero torque is solved by pre-torquing. This entails circumferentially magnetising the transducer element at a predetermined torque. The technique is advantageously applied to a pair of transducer elements (32, 34: 62, 64) whose outputs are combined (Fig. 6a: 76) to provide a range of measurement of torque (clockwise and counterclockwise) including zero torque. Various combinations of direction of pre-torque and direction of circumferential-magnetisation are discussed. A circuit (Fig. 8) is disclosed for combining the signals to obtain a reference level (84) for gain control of the combined output signals V o from the two transducer elements (60, 62). Also disclosed is the application of the invention to other forms of torque transducer element in which a magnetic field is stored. One form is longitudinal magnetisation (Fig. 10a). Another is radially spaced magnetisation (Fig. 12a: Fig. 13).